REMARKS

Overview of the Office Action

Claims 1, 3, 5, 6, 8-16 and 21-24 have been rejected under 35 U.S.C. §102(e) as being anticipated U.S. Patent No. 6,703,780 ("Shiang").

Claim 7 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Shiang.

Status of the claims

Claims 2, 4, and 17-20 have been previously canceled.

Claim 7 has now been canceled.

Claims 1, 3, 5, 8-15, and 21-22 have been amended.

Claims 1, 3, 5, 6, 7-16 and 21-24 remain pending.

Summary of subject matter disclosed in the specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed. References are made to Applicants; published application.

Applicant's specification discloses a light source (1) that includes at least one LED (2) for emitting a primary radiation (4) (see paragraph [0042]). The LED includes a semiconductor material selected from the group consisting of GaInN, GaN, and a combination thereof (see, e.g., paragraph [0022]). The light source (1) further includes at least one luminescence conversion body (3) for converting the primary radiation (4) into a secondary radiation (5) (paragraph [0043]). The luminescence conversion body is a polycrystalline ceramic body sintered together from individual base crystallites that are formed by a base material that is doped by an inhomogeneously distributed dopant such that the polycrystalline ceramic body acts partly or completely as luminescent material by virtue of at least part of the base material being activated by the dopant (paragraph [0058]). The ceramic body has a ceramic density of above 90% (paragraph [0060]), and the ceramic body is translucent to both the primary radiation and the secondary radiation (paragraph [0044]).

The LED emits blue primary radiation (paragraph [0042]). The ceramic body comprises for example a luminescent material based on a cerium-doped yttrium aluminum garnet (paragraph [0019]). This luminescent material emits yellow secondary radiation. Blue primary radiation and yellow secondary radiation penetrate through the luminescence conversion body and are perceived as white light by the observer (paragraph [0022]). In order to produce the luminescence conversion body, a polycrystalline ceramic body is united with a solution of a dopant (paragraph [0058]). By means of a thermal treatment, the dopant (activator) diffuses into the ceramic body (paragraph [0058]).

Descriptive summary of Shiang

Shiang discloses an organic light emitting diode (OLED) 1 and a ceramic output coupler 3 (see col. 5, lines 34-48 of Shiang). The OLED contains a first electrode 120, a second electrode 130, at least one organic light emitting layer 110 (col. 8, lines 26-33). The index of refraction of the output coupler is matched to that of the adjacent layer of the device (col. 5, lines 39-41). The ceramic output coupler may be a ceramic substrate with a dimpled light emitting surface which reduces Fresnel and critical angle optical losses (col. 5, lines 14-18).

Claims1, 3, 5, 6, 8-16 and 21-24 are allowable over Shiang under 35 U.S.C. § 102(e)

The Office Action states that Shiang discloses all of Applicant's recited elements.

Independent claim 1 has been amended to now recite a light source that includes, inter alia, "at least one LED for emitting a primary radiation, the LED comprising a semiconductor material selected from the group consisting of GaInN, GaN, and a combination thereof", and "wherein the luminescence conversion body is a polycrystalline ceramic body sintered together from individual base crystallites that are formed by a base material that is doped by an inhomogeneously distributed dopant such that the polycrystalline ceramic body acts partly or completely as luminescent material by virtue of at least part of the base material being activated by said dopant". Support for these claim amendments can be found, for example, in original claim 7 and in paragraphs [0056]-[0058] of Applicants' published specification.

Shiang fails to disclose, teach, or suggest the above limitations for the following reasons: (1) Shiang discloses an OLED instead of an LED; and (2) Shiang fails to disclose an inhomogeneously distributed dopant.

Regarding the first reason, the Examiner asserts that the OLED taught by Shiang is the same as the LED recited in Applicants' claims. Applicants submit that an Organic Light Emitting Diode (OLED) is not the same device as a Light Emitting Diode (LED).

An OLED device includes one or more organic light emitting layers disposed between two electrodes (e.g., a cathode and a light transmissive anode), formed on a light transmissive substrate. The organic light emitting layer emits light upon application of a voltage across the anode and cathode. Upon the application of a voltage from a voltage source, electrons are directly injected into the organic layer from the cathode, and holes are directly injected into the organic layer from the anode. The electrons and the holes travel through the organic layer until they recombine to form excited molecules or excitons. The excited molecules or excitons emit light when they decay. Further, the external quantum efficiency of OLEDs, which is defined as a ratio of the photons emitted by the device to the number of injected electrons is lower than desired (see col. 1, lines 8-28 of Shiang).

On the other hand, a Light Emitting Diode (LED) consists of a chip of inorganic semiconducting material impregnated, or doped, with impurities to create a p-n junction. Charge-carriers (i.e., electrons and electron holes) flow into the junction from electrodes with different voltages. When an electron meets a hole, it falls into a lower energy level, and releases energy in the form of a photon. Moreover, OLEDs typically emit less light per area than inorganic solid-state based LEDs, which are usually designed for use as point light sources.

Clearly an OLED is not the same device as an LED. Therefore, Shiang fails to teach or suggest a light source that includes ”at least one LED for emitting a primary radiation, the LED comprising a semiconductor material selected from the group consisting of GaInN, GaN, and a combination thereof “, as recited in Applicants’ amended independent claim 1.

Regarding the second reason, the Examiner cites col. 7, lines 24-61 of Shiang as teaching a conversion body that is doped by a dopant (Ce). However, Shiang fails to teach or suggest that “the luminescence conversion body is a polycrystalline ceramic body sintered together from individual base crystallites that are formed by a base material that is doped by an inhomogeneously distributed dopant such that the polycrystalline ceramic body acts partly or completely as luminescent material by virtue of at least part of the base material being activated by said dopant”, as now recited in Applicants’ amended independent claim 1. Shiang discloses various phosphors (based on a cerium activator doped YAG lattice) that can be used. However, Shiang does not teach or suggest how the dopant is distributed in the conversion body.

In view of the foregoing, it is apparent that Shiang fails teach or suggest the subject matter recited in independent claim 1. Accordingly, claim 1 is patentable over Shiang under 35 U.S.C. §102(e).

Dependent claims

Claims 3, 5, 6, 8-16 and 21-24, which depend directly or indirectly from independent claim 1, incorporate all of the limitations of independent claim 1 and are, therefore, deemed to be patentably distinct over Wolfgang for at least those reasons discussed above with respect to independent claim 1.

Rejection of claim 7 under 35 U.S.C. §103(a)

The Office Action states that Shiang teaches all of Applicants' recited elements. Claim 7 has been canceled. Therefore this rejection is now moot.

Conclusion

In view of the foregoing, reconsideration and withdrawal of all rejections, and allowance of all pending claims, are respectfully solicited.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned

Respectfully submitted,

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